economy. In order to understand what the important differences are, we engaged

William M. Mercer, a leading employee benefits consulting firm, to develop and

analyze basic facts about post-retirement benefits other than pensions. The most

important differences between Pacific Bell and a typical firm appear to be the

following:

1. Coverage: Pacific Bell provides post-retirement benefits to its entire pension-qualified labor force. In contrast, only about 40 percent of private sector workers are employed by firms that offer post-retirement health benefits.[35]

2. Historical liability: Pacific Bell estimates that its accumulated historical postretirement benefit obligation will be about $0.5 billion in 1993 in the interstate jurisdiction. This amount is about 33 percent of Pacific's annual interstate revenues, about 21 percent of Pacific's interstate net rate base, and about 37 percent of the equity component of the net rate base. In contrast, the accumulated historical liability for the U.S. economy is estimated at about $300 billion.[36] This amount represents about five percent of U.S. GNP and on the order of 7 to 10 percent of corporate equity.[37]

U.S. OPEB expenses are estimated to be about $13 billion in 1993 on a cash

accounting basis compared with about $82 billion on an accrual basis in 1993.[38] The

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[35]United States General Accounting Office, "Extent of Companies' Retiree Health Coverage," Prepared for Congress, March 1990 (GAO-1990).

[36]Statement of Gregory J. McDonald, United States General Accounting Office, Before the Subcommittee of Health, Ways and Means Committee of the House of Representatives, May 6, 1991.

[37]U.S. General Accounting Office, "Companies' Retiree Health Liabilities Large, Advance Funding Costly," Report to Congress, June 1989 (GAO-1989). Mark Warshawsky, "The Uncertain Promise of Retiree Health Benefits: An Evaluation of Corporate Obligations," Retiree Health Benefits Seminar, American Enterprise Institute, Washington, D.C., April 9, 1991.

[38]Mercer first evaluated a number of existing studies of corporate obligations for OPEBs and concluded that the GAO-1991 study was the most reliable in terms of credibility and methodology. This study produced an estimate of $42 billion for accrual accounting expenses under FAS 106 procedures in 1991. Mercer then modified a number of assumptions to conform more closely with FAS 106 requirements and carried the calculations forward to 1993, in the process producing the higher figure.

change is thus $69 billion out of an estimated GNP of $6,260 billion, or 1.10 percent.[39] Since the incidence of OPEBs appear to be uniformly distributed across industries, it is reasonable to assume that firms in the cost-plus sector increase prices by 1.10 percent in response to FAS 106.[40] Firms in the rest of the economy have already reflected accrual accounting in their prices, so the net effect of FAS 106 on the GNP-PI would be less than 0.12 percent (twelve-hundredths of one percent) instead of the 0.20 percent bound calculated above.[41] Thus, if cost-plus firms experience the U.S. average OPEB expense increase (1.10 percent) instead of the Pacific Bell increase (1.92 percent), GNP-PI would increase by less than 0.12 percent and the required Z factor would exceed 1.80 percent. Thus, less than 6.26 percent of the exogenous cost change is reflected in the GNP-PI, leaving more than 93.74 percent to be recovered through the Z factor.[42]

This estimate of the effect of FAS 106 on the GNP-PI is an upper bound for several reasons. First, we have overstated the size of the cost-plus sector of the economy by assuming that all public utility prices are set using accounting costs and treating all government contracts as cost-plus contracts with accounting change escalators. Second, this calculation ignores second-order effects that would lower the impact on national output prices. As prices rise in the cost-plus sector, for example,

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[39]The 1993 GNP forecast was downloaded from Data Resources, Inc.

[40]A GAO survey in 1990 compared health coverage of retirees by type of industry and concluded that there was "little variation among companies with retiree health benefits when comparing companies by industry group," GAO-1990 Report, pp. 6-7. Thus the impact of FAS 106 on expenses for firms in the cost-plus sector should be roughly the same as the U.S. average of 1.10 percent.

[41]Thus (1.10 * 0.1049) + (0.0 * 0.8951) = 0.12 percent.

[42]Because [1.92 - 0.12]/1.92 = 93.74 percent and 0.12/1.92 = 6.26 percent.

consumers substitute away from these goods and services which reduces the net effect of the price increase in the cost-plus sector on overall inflation. Finally, the calculation ignores second-order macroeconomic responses to the change in output prices through changes in government expenditure, interest rates and the money supply.

A summary of these calculations may be useful. Recall that we wish to increase Pacific Bell's price cap by 1.92 percent which represents the change in expenses due to the shift from cash to accrual accounting for OPEBs in 1993. Some of this increase will be accounted for by the change in inflation; the rest must be supplied through the Z-adjustment we are calculating. The increase in inflation due to FAS 106 is measured in two steps: (i) we calculate the effect of FAS 106 on the expenses of an average ¬m to be 1.10 percent, and (ii) we calculate the fraction of GNP produced by firms whose prices do not already reflect accrual accounting for OPEBs to be less than 10.49 percent. Since the incidence of OPEBs across industries is roughly constant, we estimate that the prices at which less than 10.49 percent of GNP is sold will increase by 1.10 percent, so that the increase in GNP-PI, averaged over all firms, will be less than 0.12 percent. Using this bound as an estimate, Pacific Bell's 1.92 percent price increase would thus consist of a 0.12 percent increase in GNP-PI and a 1.80 percent Z-adjustment. The required Z-adjustment (net of the change in GNP-PI) is thus at least 93.74 percent of the $29 million change in expenses, or at least $27 million.

These results are stable with respect to the various assumptions and forecasts that we have made. In Table 2, we summarize our previous results and provide new estimates assuming (i) a 100 percent increase in the effect of FAS 106 on an average

Table 2
Summary of Results
and
Sensitivity Analysis

	BASE CASE	NATIONAL FAS EFFECT IS 100% LARGER	COST-PLUS SECTOR IS 100% LARGER	PB REVENUE FORECAST IS 10% LARGER
PAC BELL FAS EFFECT	1.92%	1.92%	1.92%	1.74%
GNP-PI EFFECT	0.12%	0.23%	0.23%	0.12%
Z-ADJUSTMENT	1.80%	1.69%	1.69%	1.62%
% FAS IN GNP-PI	6.26%	12.01%	12.01%	6.89%
% FAS IN Z	93.74%	87.99%	87.99%	93.11%
Z	$26,808	$25,166	$25,166	$26,629

U.S. firm, (ii) a 100 percent increase in the cost-plus proportion of the U.S. economy, and (iii) a 10 percent increase in our forecast of Pacific Bell's 1993 revenues. Clearly, the results are insensitive to the assumptions.

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APPENDIX

In this Appendix, we provide the details of the derivation of the price cap annual adjustment formula. The logic follows that of Dr. Schankerman, whose presentation of the price cap formula formed the basis of the California price cap plan.[43]

A.   The Relationship Among TFP. Input Price. and Output Price Growth

Consider a multiproduct firm having N outputs (Q_i^o, i = 1,...,N) and M inputs (Q_j^i, j = 1,...,M). We wish to calculate X and Z so that in all periods, economic profits are identically zero, i.e., that the value of total inputs (including a normal return on capital) equals the value of total output. The identity can be written as

$$\sum_{i=1}^{N} p_i Q_i^o = \sum_{j=1}^{M} w_j Q_j^i \,,$$

where p_i and w_j denote output and input prices respectively. Differentiating this identity with respect to time yields

$$\sum_{i=1}^{N} \dot{p}_i Q_i^o + \sum_{i=1}^{N} p_i \dot{Q}_i^o = \sum_{j=1}^{M} \dot{w}_j Q_j^i + \sum_{j=1}^{M} w_j \dot{Q}_j^i,$$

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[43]Testimony of Mark Schankerman on behalf of GTE California Incorporated, Docket I. 87-11-033, Technical Appendix, pp. 1-3.

where a dot indicates a derivative with respect to time. Dividing both sides of the equation by the value of output $R = \sum_i p_i Q_i^{\bullet}$ or $C = \sum_j w_j Q_j'$, we obtain

$$\sum \dot{p}_i \left(\frac{Q_i^{\bullet}}{R} \right) + \sum \dot{Q}_i^{\bullet} \left(\frac{p_i}{R} \right) = \sum \dot{w}_j \left(\frac{Q_j'}{C} \right) + \sum \dot{Q}_j' \left(\frac{w_j}{C} \right),$$

where R and C denote revenue and cost. If r_i denotes the revenue share of output i and c_j denotes the cost share of input j, then

$$\sum_i r_i \, dp_i = \sum_j c_j \, dw_j - [\sum_i r_i \, dQ_i^{\bullet} - \sum_j c_j \, dQ_j'],$$

where d denotes a percentage growth rate: $dp_i = \dot{p}_i / p_i$. The first term in the above equation is the revenue weighted average of the rates of growth of output prices, and the second is the cost-weighted average of the rates of growth of input prices. The term in brackets is the difference between the rates of growth of weighted averages of outputs and inputs and is thus the change in TFP. We can write the equation as

$$dp = dw - dTFP.$$

Thus the growth in input prices less the growth in output prices is equal to the change in TFP. This result requires only that excess profits are zero in every period. It does not require cost minimization, profit maximization, marginal cost pricing, or constant returns to scale.

B.   The Price Cap Adjustment Equation

We begin with equation (3) from the text:

(6) $\qquad dp = dp^N - [dTFP - dTFP^N + dw - dw^N] + [Z^* - Z^{*N}].$

If we measure national output price inflation by the change in GNP-PI, we obtain

(7) $\qquad dp = GNP-PI - X + Z'$

where $X = [dTFP - dTFP^N] + [dw - dw^N]$ and $Z' = Z^* - Z^{*N}$. Since the

percentage change in the regulated firm's output price between years t-1 and t is just

$[p_t - p_{t-1}] / p_{t-1}$, we can write equation (7) as

$$\frac{p_t - p_{t-1}}{p_{t-1}} = GNP-PI - X + Z'$$

so

$$p_t - p_{t-1} = p_{t-1} \times [GNP-PI - X + Z']$$

which simplifies to

(8) $\qquad p_t = p_{t-1} \times [1 + GNP-PI - X + Z'].$

Since revenue equals price times quantity, the revenue change associated with the price

change in equation (8) is obtained by multiplying both sides of the equation by the

fixed amount of quantity demanded:

$$q_{t-1} \times p_t = q_{t-1} \times p_{t-1} \times [1 + GNP-PI - X + Z']$$

or

(9) $\qquad R_t = R_{t-1} \times [1 + GNP-PI - X] + Z$

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where Z represents the total dollar value of the exogenous cost change rather than the unit cost change.